

A MANGROVE HYBRID, *SONNERATIA* × *GULNGAI* (SONNERATIACEAE) FROM NORTH-EASTERN AUSTRALIA

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Summary

The hybrid *Sonneratia* taxon, *S. alba* × *S. caseolaris*, previously reported from an isolated stand in north-western Borneo, has been observed in north-eastern Australia as widespread and consistent in morphological form. The taxon is described as *S. × gulngai*. Notes on its floral phenology, distribution in Australia and its ecology are given.

Backer & van Steenis (1951) recognised five species of *Sonneratia*. These taxa are found from eastern Africa to the western Pacific in tropical coastal areas. One species, *S. alba*, is found throughout this region and the other taxa are found in limited distributions in the Indo-Malesian area. Australia was seen to be located at the distributional limits of the widespread species, *S. alba*, and possibly one other, *S. caseolaris*. However, following the discovery of putative hybrid forms in north-western Borneo by Muller & Hou-Liu (1966), similar plants were expected to be found in northern Australia (Muller & van Steenis, 1968) although evidence for the occurrence of species other than *S. alba* was scant (van Steenis, 1968).

Recent detailed Australian and Papua New Guinea surveys (e.g. Bunt *et al.*, 1982) dating back to 1976 now provide evidence of the occurrence of *S. caseolaris* in north-eastern Australia as well as a third taxon which is in some ways referable to the putative hybrid, *S. alba* × *S. caseolaris*, described but not formally named, by Muller & Hou-Liu (1966). However, there are some differences, although both appear referable to the same putative parents. Because distribution of the Australian form is relatively extensive and shows little morphological variation throughout its range the taxon is recognised as a distinct entity, *S. × gulngai*. The name was taken from that of a native tribe which inhabited the area in the vicinity of the Tully River mouth where this taxon was first observed in Australia by J. S. Bunt. The epithet is indeclinable in Latin.

The hybrid status of *S. × gulngai* is supported by the evidence which is briefly listed:

1. intermediate and shared morphological characters;
2. reduced fertility, and distinctive shape and character of the pollen (Wright, 1977);
3. poor fruit maturation;
4. confused floral phenology — apparently taking characteristics of each of the putative parental cycles;
5. luxuriant growth of tree form and foliage;
6. distribution in Australia limited to those estuaries where *S. caseolaris* also occurs; and
7. numbers of individuals usually quite low; more plants are found in those estuaries where the distributions of *S. alba* and *S. caseolaris* overlap.

Taxonomy

Measurements taken from dried specimens unless otherwise stated. Means are given in brackets.

**Sonneratia* × *gulngai* N.C. Duke, sp. nov.

Sonneratia alba Smith × *S. caseolaris* (L.) Engler, Muller & Hou-Liu, Blumea 14:388 (1966).

**Sonneratia* × *gulngai* N. C. Duke, hybrida naturalise *S. alba* Smith et *S. caseolaris* (L.) Engler exorta. Notae dissimiles illis *S. albae* autem similes illis *S. caseolaris*: folia costa prominenti et apice plerumque incrassato; pneumatophora plerumque ca 80 cm alta, gracilia, acuta; calycis lobi pro parte maxime 6; petala in alabastro mature semper rubra, linearia; stylus in

flore recentiter aperto pro parte maxime plus quam 5 cm longus; lobi calycis fructus maturi plus quam 2.2 cm longi; semina angularia et non falcata. Notae dissimiles illis *S. caseolaris* autem similes illis *S. albae*; caulis parum infra inflorescentiam pro parte maxime rotundatus, laevis; alabastrum diametro partis superae et partis infernae simili sed leviter constrictum inter eas; fructus maturus aliquantum cylindricus, erectus, plerumque minus quam 1.7 cm altus, raro excedens latitudine diametrum corollae, calyce cyathiformi, pagina laevi, impolita. Notae intermediae inter illis *S. albae* et *S. caseolaris*: longitudo petioli; longitudo styli et latitudo stigmatis in gradibus omnibus auctus. Notae dissimiles illis ambarum speciebus: dimensiones majores arboris, foliorum, alabastrorum maturorum, florum apertorum, calycum fructus, et longitudo petalorum. Dimensions minores observatae non nisi ratione longitudinis latitudinisque foliorum. **Typus:** N. C. Duke AIMS-547 (BRI holotypus: AIMS, CANB, JCT, K, L, isotypi).

Spreading tree *ca* 25 m high; canopy rather dense. Trunk base simple. Bark smooth or fissured and flaky, grey. Pneumatophores thin, pointed and often branched, *ca* 80 cm high. Leaves: lamina obovate 52–85(80) mm long, 38–64(54) mm wide, dull green, with prominent midvein, the tip acuminate, recurved, often thickened; petiole 6–14(11) mm long. Inflorescences with one or two buds. Mature buds, acute to obtuse, attenuate to obtuse at the base, medially constricted, the upper and lower portions often similar, in all 25–35(31) mm long, 10–20 mm wide. Flowers: hypanthium shiny, smooth, without ribs; calyx lobes (5–)6(–7), 15–23(18) mm long; petals always present, linear, 20–41(33) mm long, 1–3(2) mm wide when fresh, red; staminal filaments numerous, *ca* 37 mm long when fresh, red; anthers yellow; petals and stamens fall within hours after anthesis; style *ca* 30 mm long; stigma fungiform, *ca* 2 mm wide; ovary 13–17(15) locular. Berry erect globose, 10–20(12) mm long, 29–48(39) mm wide, sometimes indented around style base; pericarp leathery, smooth, glossy without ribs; calyx persistent, 41–47(44) mm from base of fruit to tip of sepals; calyx lobes erect 23–28(27) mm long. Seeds numerous, angular.

COOK DISTRICT: McIvor River, (15° 08'S, 145° 14'E), 8 Dec 1978, N. C. Duke AIMS-547. (**Type:** BRI, holo; AIMS, CANB, JCT, K, L, iso).

Differences from *S. alba* and affinities with *S. caseolaris* include: leaf mid-vein prominent, leaf tip often thickened; pneumatophores usually *ca* 80 cm high, thin and pointed; calyx lobes mostly *ca* 6; petals in mature flower bud always red and linear; mature fruit calyx lobes mostly more than 2.2 cm long; seeds angular and not sickle-shaped.

Differences from *S. caseolaris* and affinities with *S. alba* include: stem just below the inflorescence mostly rounded and smooth; mature flower bud surface smooth and shiny, diameter at upper and lower portions similar, with slight constriction between; mature fruit calyx cup-shaped; mature fruit surface smooth and dull with width rarely exceeding the corolla diameter; mature fruit height mostly less than 1.7 cm; and fruit erect, somewhat cylindrical.

Characters intermediate between *S. caseolaris* and *S. alba*: petiole length; style length and stigma width at all developmental stages.

Characters different from *S. caseolaris* and *S. alba*: larger size of tree, leaves, mature flower bud, open flower, petals and fruit calyx. Lesser dimensions only observed for the length to width ration of leaves.

Floral Phenology

The floral development cycle of the hybrid is confused and is coupled with the observation of extremely poor fruit maturation. Cycles for each of the putative parents are distinct and seasonal, but *S. × gulngai* exhibits both cycles within the same plant. This dual character of the hybrid is briefly summarised by the bimodal peak flowering and fruiting periods which coincide with those of *S. alba* and *S. caseolaris*, respectively, in this region (Duke *et al.*, in press). *S. × gulngai* flowers mainly around December and also in March. Pollen has a reduced fertility with *ca* 30 per cent collapsed grains. Much young fruit drops shortly after peak flowering has passed. Mature fruit falls mainly in March and August. Development period is *ca* 3–5 months for each cycle.

Australian Distribution

On the north-eastern coast *S. × gulngai* occurs from the Murray River (18° 05'S, 146° 01'E) in the south, to the Olive River (12° 10'S, 143° 05'E) in the north. It is limited to estuaries which have both *S. caseolaris* and *S. alba*. The latter species is widespread, therefore the possible limitations on the distribution in Australia of the hybrid are linked to the occurrence of the less common *S. caseolaris*. Occurrence is more frequent in estuaries where the distributions of *S. alba* and *S. caseolaris* overlap. Distribution throughout Indo-Malesia is expected to be widespread while being subject to the constraints already outlined.

Ecology

S. ×gulgai is easily distinguished in the field by its size and luxuriant foliage (i.e. darker green canopy appearance, including larger leaves and fruits). It is found commonly at the downstream limits of *S. caseolaris* which often places it centrally within Australian estuaries. In this position the species occurs in lower to middle tidal contours; i.e., above and behind *S. caseolaris*. Here it is commonly associated with *Bruguiera parviflora* and *Xylocarpus granatum*. To a lesser extent the species is also associated with *Rhizophora mucronata* and *Nypa fruticans*. *S. ×gulgai* is usually found on firm mud or silt.

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